


iCASP Briefing Paper:

Rapid Evidence Review of Agricultural Land Management for Public Goods Delivery (Soil Health)

Healthy soil underpins the delivery of public goods such as food security, flood protection and climate change mitigation, but evidence on how some of the most commonly promoted agricultural practices improve soil health is limited.

Our recommendation therefore is to address the evidence gaps below through ELMS pilot trials by involving farmers and other land managers to develop the evidence-base for on-farm approaches that are feasible.

Key Findings of iCASP's rapid, impartial review of **academic evidence** (240 peer-reviewed papers) on the influence of 10 different land management activities on 8 key soil health indicators with well established causal relationships to soil functions that deliver public goods:

- Conservation tillage, the addition of organic amendments, introduction of grass-clover leys into arable rotations, and conversion of arable land to woodland can **all enhance soil health.**
- Cover crops (single species) and over-winter stubble do not appear to improve soil health in the short-term, **but they are important** for reducing soil erosion and leaching of nutrients (and therefore **protecting water quality**).
- Not all management activities aimed at improving soil health will deliver multiple public goods, there may be improvement in some and deterioration in others, so careful scrutiny of the evidence is needed as any **trade-offs** between public goods will need to be quantified.

Evidence Gaps:

- Very few studies (only 3) reported the impact of the land management activity on **crop yield** as well as soil health indicators, making it difficult to evaluate how best to develop agricultural systems which are able to balance productivity with protecting and enhancing the environment.
- There are knowledge gaps regarding the **optimal species** combinations to use for enhancing soil quality in both arable to woodland planting, hedge planting, and cover crops and leys in arable rotations.
- There is a lack of data on how soil health indicators and thus soil functions respond to changes in land management at **soil depths of > 30 cm.**
- The majority of studies (81%) were carried out at **field scale** so it is important that we identify how improvements in soil health result in public goods delivery at the **landscape scale.** iCASP will be piloting some modelling studies to help address this.

Contact us for further information:
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https://icasp.org.uk/resources/public-goods/

iCASP
Integrated Catchment Solutions Programme

iCASP is a UKRI-Natural Environment Research Council-funded partnership. It is making environmental evidence available to develop innovative solutions to water and land management issues. It aims to generate £50 million+ benefits to Yorkshire's economy by 2022 and to inform regional and national practices and policies. These include the 25 Year Environment Plan. https://icasp.org.uk/. Funded by NERC Grant: NE/P011160/1